

PATENT ABSTRACTS OF JAPAN

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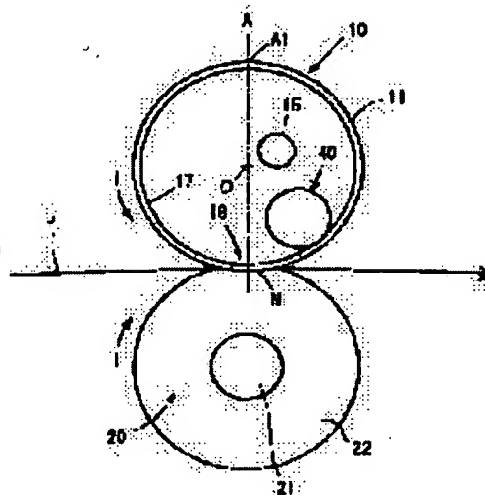
(54) FIXING DEVICE

(57)Abstract:

82857-03

PROBLEM TO BE SOLVED: To provide a fixing device that can shorten a warming-up time, has a simple the structure (control) of a heat generating body and can efficiently uniformize temperature distribution in the axial direction of a heating roller.

SOLUTION: Inside the hollow pipe type heating roller 10 with a heater 15 arranged inside, a high heat conductive roller 40 is arranged so that it may come into contact with the inner peripheral surface 17 of the roller 10 in the axial direction. The high heat conductive roller 40 is arranged near the downstream or near the upstream of a part 18 corresponding to the press contact position N with the pressure roller 20 in the rotating direction of the heating roller, and the heater 15 is arranged on the downstream side so as to be deviated from the rotational center of the heating roller.



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CLAIMS

[Claim(s)]

[Claim 1] An anchorage device characterized by preparing in the interior a high temperature conduction member which contacts that inner skin in that direction of an axis inside said heating roller in an anchorage device equipped with a hollow pipe-like heating roller with which a heater has been arranged, and a pressurization roller by which the pressure welding is carried out to this heating roller.

[Claim 2] An anchorage device according to claim 1 characterized by said high temperature conduction member consisting of rollers.

[Claim 3] An anchorage device according to claim 1 or 2 with which said high temperature conduction member is characterized by contacting inner skin of a heating roller [near the lower stream of a river of a part corresponding to a pressure-welding location with a pressurization roller] about a hand of cut of a heating roller.

[Claim 4] An anchorage device according to claim 1 or 2 with which said high temperature conduction member is characterized by contacting inner skin of a heating roller [near the upstream of a part corresponding to a pressure-welding location with a pressurization roller] about a hand of cut of a heating roller.

[Claim 5] An anchorage device according to claim 1 or 2 characterized by preparing said at least two high temperature conduction members, for the one high temperature conduction member contacting inner skin of a heating roller about a hand of cut of a heating roller [near the lower stream of a river of a part corresponding to a pressure-welding location with a pressurization roller], and other one high temperature conduction member contacting inner skin of a heating roller [near the upstream of said part].

[Claim 6] It is an anchorage device given in any 1 term among claims 1-5 characterized by for said heater deflecting from the center of rotation of a heating roller, and arranging it about a hand of cut of a heating roller at the downstream of a part corresponding to a pressure-welding location with a pressurization roller.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] This invention relates to the anchorage device used for image formation equipments, such as a printer which can form a toner image in record material, such as a form, using electrophotographic technology, facsimile, and a copying machine.

[0002]

[Description of the Prior Art] Generally the image formation equipment which forms a toner image on record material (only henceforth a form), such as a form, using electrophotographic technology The photo conductor by which a rotation drive is carried out, and an exposure means to be exposed to this photo conductor and to form an electrostatic latent image in the surface, It has the anchorage device which said electrostatic latent image is developed, and it heats [anchorage device], passing the form by which the toner image was imprinted with a toner image, the development means to make, an imprint means to make a form imprint that toner image, and this imprint means, and fixes a toner image on a form.

[0003] The conventional common anchorage device is equipped with the pressurization roller by which the pressure welding is carried out to the heating roller heated and this heating roller, with both [these] rollers, is heated compressing the form to pass and carries out melting fixing of the toner image on a form on a form.

[0004] In such an anchorage device, although it is desired for the temperature distribution in the direction of an axis of both rollers, especially a heating roller to be uniform Since heat is taken by the form (and toner) in the contact section with the form in both rollers and heat is not taken by the form in the non-contact section because a form passes the pressure-welding section of both rollers, When fixing actuation is performed especially continuously, compared with the above-mentioned contact section, the temperature of the non-contact section rises remarkably, and there is a problem that it becomes difficult to maintain the temperature distribution in the direction of an axis of both rollers to homogeneity as a result.

[0005] Then, in order to solve such a problem, the following technology is already proposed conventionally.

(1) Prepare two or more heating elements with different exoergic distribution about the direction of an axis of a heating roller, and change the heating element to operate according to the temperature distribution of the heating roller at the time of fixing.

(2) Raise the thermal conductivity and the heat capacity in the direction of an axis by enlarging the cross section of a heating roller, and attain equalization of temperature distribution.

(3) As shown in drawing 7 , to the surface of a heating roller 1, contact the member 3 of high temperature conductivity and attain equalization of temperature distribution (JP,8-87191,A). In addition, in drawing 7 , 2 is a pressurization roller.

[0006]

[Problem(s) to be Solved by the Invention] There are the respectively following problems in the Prior art mentioned above.

(1) Prepare two or more heating elements with different exoergic distribution about the direction

of an axis of a heating roller, and with the technology of changing the heating element operated according to the temperature distribution of the heating roller at the time of fixing, the structure of a heating element portion and control are complicated and it is easy to cause an equipment failure.

(2) raise the thermal conductivity and the heat capacity in the direction of an axis by enlarging the cross section of a heating roller, and with the technology of attaining equalization of temperature distribution, since the heat capacity of a heating roller becomes large, warm-up time (build up time until a heating roller reaches predetermined temperature) becomes long, consider as a result, and the futility of energy increases.

(3) since the member 3 of high temperature conductivity is contacted and the high temperature conductivity member 3 touches to the surface of a heating roller 1 with the technology of attaining equalization of temperature distribution, to the surface of a heating roller 1 shown in drawing 7, heat release other than heating roller 1 from the high temperature conductivity member 3 becomes large, can not necessarily attain equalization of the temperature distribution in the direction of an axis of a heating roller efficiently, and there is. [no]

[0007] It is easy (therefore, also in case of control), and the structure of warm-up time of a heating element portion is short, and ends [the above problems are solved,], and the purpose of this invention is to offer the anchorage device which can attain equalization of the temperature distribution in the direction of an axis of a heating roller efficiently.

[0008]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, an anchorage device according to claim 1 is characterized by preparing in the interior a high temperature conduction member which contacts that inner skin in that direction of an axis inside said heating roller in an anchorage device equipped with a hollow pipe-like heating roller with which a heater has been arranged, and a pressurization roller by which the pressure welding is carried out to this heating roller. An anchorage device according to claim 2 is characterized by said high temperature conduction member consisting of rollers in an anchorage device according to claim 1. An anchorage device according to claim 3 is characterized by said high temperature conduction member contacting inner skin of a heating roller about a hand of cut of a heating roller [near the lower stream of a river of a part corresponding to a pressure-welding location with a pressurization roller] in an anchorage device according to claim 1 or 2. An anchorage device according to claim 4 is characterized by said high temperature conduction member contacting inner skin of a heating roller about a hand of cut of a heating roller [near the upstream of a part corresponding to a pressure-welding location with a pressurization roller] in an anchorage device according to claim 1 or 2. An anchorage device according to claim 5 is set to an anchorage device according to claim 1 or 2. Said at least two high temperature conduction members are prepared. The one high temperature conduction member It is characterized by contacting inner skin of a heating roller [near the lower stream of a river of a part corresponding to a pressure-welding location with a pressurization roller], and other one high temperature conduction member contacting inner skin of a heating roller [near the upstream of said part] about a hand of cut of a heating roller. It is characterized by for said heater deflecting [in / among claims 1-5 / an anchorage device given in any 1 term] an anchorage device according to claim 6 from the center of rotation of a heating roller, and being arranged about a hand of cut of a heating roller at the downstream of a part corresponding to a pressure-welding location with a pressurization roller.

[0009]

[Function and Effect] In the anchorage device which was equipped with the hollow pipe-like heating roller with which the heater has been arranged inside, and the pressurization roller by which the pressure welding is carried out to this heating roller according to the anchorage device according to claim 1 Since the high temperature conduction member which contacts the inner skin in the direction of an axis is prepared in the interior of said heating roller if the temperature distribution in the direction of an axis of a heating roller become an ununiformity, and it is going to become or, the heat of the elevated-temperature section in a heating roller will become possible [maintaining temperature distribution / in / to the low-temperature section / the

direction of an axis of a heating roller / to homogeneity by propagation and this through a high temperature conduction member]. And since what is necessary is just to prepare the high temperature conduction member which contacts the inner skin in the direction of an axis in the interior of a heating roller, it becomes unnecessary to prepare two or more heating elements, and the structure of a heating element portion and control are easy, and stop also being able to produce an equipment failure easily. Moreover, since it becomes unnecessary to enlarge the cross section of the heating roller itself, warm-up time is short and ends. Furthermore, since unlike what was shown in drawing 7 the high temperature conductivity member is prepared in the interior of a hollow pipe-like heating roller and the inner skin of a heating roller is contacted, heat release other than the heating roller from a high temperature conductivity member will decrease, and equalization of the temperature distribution in the direction of an axis of a heating roller will be efficiently attained as a result. That is, according to this anchorage device according to claim 1, it is simple for the structure of a heating element portion (therefore, also in case of control), and warm-up time is also short, it ends, and the effect that equalization of the temperature distribution in the direction of an axis of a heating roller can be attained efficiently is acquired. And although there was a difficulty that the surface of a heating roller 1 tends to deteriorate, and equipment is enlarged, in the conventional technology shown in drawing 7 since the high temperature conductivity member 3 touched the surface of a heating roller 1. Since according to this anchorage device according to claim 1 the high temperature conductivity member is prepared in the interior of a hollow pipe-like heating roller and contacts the inner skin of a heating roller, the surface of a heating roller does not deteriorate but the effect of not enlarging equipment, either is acquired. According to the anchorage device according to claim 2, in an anchorage device according to claim 1, since said high temperature conduction member consists of rollers, the touch area of a high temperature conductivity member and heating roller inner skin becomes large, and becomes possible [attaining equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently]. And since the high temperature conduction member consists of rollers, the effect that the rotation load of a heating roller does not increase compared with the case where a high temperature conduction member is constituted for example, from a slide contact member is also acquired. According to the anchorage device according to claim 3, in an anchorage device according to claim 1 or 2, since said high temperature conduction member contacts the inner skin of a heating roller about the hand of cut of a heating roller [near the lower stream of a river of the part corresponding to a pressure-welding location with a pressurization roller], it becomes possible [attaining equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently] so that it may explain below. Namely, as mentioned above, it sets to this kind of anchorage device. Since heat is taken by the form (and toner) in the contact section with the form in both rollers and heat is not taken by the form in the non-contact section because a form passes the pressure-welding section of a heating roller and a pressurization roller, The temperature distribution in the direction of an axis of a heating roller tend to become an ununiformity remarkably about the hand of cut of a heating roller [near the lower stream of a river of the part corresponding to a pressure-welding location with a pressurization roller]. According to this anchorage device according to claim 3, on the other hand, a high temperature conduction member The near lower stream of a river of the part corresponding to a pressure-welding location with a pressurization roller about the hand of cut of a heating roller. Namely, since the temperature distribution in the direction of an axis of a heating roller tend to become an ununiformity remarkably and the inner skin of a heating roller is contacted in the big location of a temperature gradient The heat of the elevated-temperature section (part corresponding to the non-contact section with a form) in a heating roller will get across to the low-temperature section (part corresponding to the contact section with a form) efficiently through a high temperature conduction member. Therefore, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently. According to the anchorage device according to claim 4, it sets to an anchorage device according to claim 1 or 2. Since said high temperature conduction member contacts the inner skin of a heating roller about the hand of cut of a heating roller [near the upstream of the part

corresponding to a pressure-welding location with a pressurization roller] Just before a heating roller contacts a form, equalization of the temperature distribution in the direction of an axis will be attained, and the stable fixing condition will be acquired as a result. According to the anchorage device according to claim 5, it sets to an anchorage device according to claim 1 or 2. Said at least two high temperature conduction members are prepared. The one high temperature conduction member Since the inner skin of a heating roller is contacted [near the lower stream of a river of the part corresponding to a pressure-welding location with a pressurization roller] and other one high temperature conduction member contacts the inner skin of a heating roller [near the upstream of said part] about the hand of cut of a heating roller While equalization of the temperature distribution in the direction of an axis of a heating roller is efficiently attained in immediately after contact in a form by the one high temperature conduction member top The letter of fixing which equalization of the temperature distribution in the direction of an axis in front of contact in a form will be attained, and was further stabilized as a result by other one high temperature conduction member ** will be obtained. Among claims 1-5, in an anchorage device given in any 1 term, since said heater is deflecting from the center of rotation of a heating roller and is arranged about the hand of cut of a heating roller at the downstream of the part corresponding to a pressure-welding location with a pressurization roller, according to the anchorage device according to claim 6, it becomes possible [attaining equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently] so that it may explain below. Namely, as mentioned above, it sets to this kind of anchorage device. Since heat is taken by the form (and toner) in the contact section with the form in both rollers and heat is not taken by the form in the non-contact section because a form passes the pressure-welding section of a heating roller and a pressurization roller, The temperature distribution in the direction of an axis of a heating roller tend to become an ununiformity about the hand of cut of a heating roller in the downstream of the part corresponding to a pressure-welding location with a pressurization roller. On the other hand, since according to this anchorage device according to claim 6 the heater is deflecting from the center of rotation of a heating roller and the temperature of a contact part with the form in the downstream of an axis of the part corresponding to a pressure-welding location with a pressurization roller, i.e., the direction of a heating roller, is arranged about the hand of cut of a heating roller in the low location, the heat supply from the heater to that low-temperature section will be made efficiently. Therefore, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently. It follows, and this configuration according to claim 6 becomes effective especially, when it combines with the configuration of above-mentioned claim 3.

[0010]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

Partial abbreviation III-III end view [in / the outline front view and drawing 2 which show the important section of the gestalt of operation of the 1st of the anchorage device which <gestalt of the 1st operation> drawing 1 requires for this invention, and / in drawing 3 / drawing 2], and drawing 4 are the expanded sectional views of a heating roller. [a positive cross section]

[0011] As shown in these drawings, this anchorage device is equipped with the pressurization roller 20 by which the pressure welding is carried out to a heating roller 10 and this heating roller 10.

[0012] As a heating roller 10 is shown in drawing 4 , it has the metal pipe 11, the elastic layer 12 covered by the surface, and surface (for example, PFA layer) 12a further covered by the surface, and as shown in drawing 1 and drawing 2 , the both ends of a pipe 11 are supported by the frame 30 of an anchorage device pivotable by the bearing 13 and the supporter material 14. The heater 15 which is an exoergic means is inserted in the interior of a pipe 11, and a heating roller 10 is heated at this heater 15. The gear 16 is being fixed to that end and the rotation drive of the heating roller 10 is carried out by having geared with the gear of the drive which has the motor which this gear 16 does not illustrate.

[0013] Moreover, the high temperature conduction member 40 which contacts the inner skin 17

in the direction of an axis (it sets to drawing 2 and is a longitudinal direction) is formed in the interior of a heating roller 10. The high temperature conduction member 40 can be constituted from a material with the high thermal conductivity of aluminum, copper, etc., and the roller which consists of aluminum constitutes it from the gestalt of this operation. Furthermore, the gestalt of this operation has covered the surface (contact surface with the inner skin 17 of a heating roller 10) of the high temperature conduction roller 40 in the elastic layer 41 of high temperature conductivity, in order to make contact to the inner skin 17 of a heating roller 10 certainly and smooth and to extend a touch area further, as shown in drawing 4. As shown in drawing 2, the shaft 42 of those both ends is supported by the bearing 43 pivotable, and a pressure welding is carried out to the inner skin 17 of the heating roller 10 by this bearing 43 being energized towards the inner skin 17 of a heating roller 10 with the spring 44, and it follows and rotates the high temperature conduction roller 40 to a heating roller 10. As shown in drawing 3, the high temperature conduction roller 40 touches the inner skin 17 of a heating roller 10 [near the lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20] about the hand of cut (it sets to drawing 3 and is a counterclockwise rotation) of a heating roller 10.

[0014] As shown in drawing 3, the heater 15 is deflected from the center of rotation O of a heating roller 10, and is arranged about the hand of cut of a heating roller 10 at the downstream of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20. In addition, as shown in drawing 3, when the heating roller 10 is carried out for 2 minutes by the center of rotation O and the segment (normal of the pressure-welding section N) A which passes along the pressure-welding section (pressure-welding location) N, The field (it sets to drawing 3 and is on the right-hand side of Segment A) which reaches the division location A1 located from the pressure-welding section N along the hand of cut of a heating roller 10 in the opposition was called downstream, and the field (it sets to drawing 3 and is on the left-hand side of Segment A) from the division location A1 to the pressure-welding section N is called upstream. In drawing 1 and drawing 2, 15a and 15a are supporter material which is supporting the heater 15 on the frame 30.

[0015] It has the shaft 21 and the elastic body 22 with which the surroundings of this shaft 21 were equipped, the both ends of a shaft 21 are supported by the bearing 23 pivotable, and the pressure welding of the pressurization roller 20 is carried out to the heating roller 10 by this bearing 23 being energized towards a heating roller 10 with the pressurization spring 24, and it is followed and rotated to a heating roller 10.

[0016] A toner image is fixed on Form P by heating them, the above anchorage devices passing the form P by which the toner image was imprinted with the imprint means which is not illustrated in the pressure-welding section N of a heating roller 10 and the pressurization roller 20 in the direction shown in drawing 3 by the arrow head. In addition, in drawing 1, P has shown an example of the passage range of a form (copy paper field).

[0017] According to the above anchorage devices, the following operation effects are acquired. (a) The hollow pipe-like heating roller 10 with which the heater 15 has been arranged inside, Since it has the pressurization roller 20 by which the pressure welding is carried out to this heating roller 10 and the high temperature conduction member 40 which contacts that inner skin 17 in that direction of an axis is formed in the interior of a heating roller 10 if the temperature distribution in the direction of an axis of a heating roller 10 become an ununiformity, and it is going to become or -- As the heat of the elevated-temperature section (for example, part 10a which is equivalent to the both ends of the **** field P in drawing 1 (refer to drawing 2)) in a heating roller 10 shows drawing 2 by the arrow head a through the high temperature conduction member 40, to the low-temperature section (for example, part 10b which is equivalent to the **** field P in drawing 1 (refer to drawing 2)) Propagation, It becomes possible to maintain the temperature distribution in the direction of an axis of a heating roller 10 to homogeneity by this. And since what is necessary is just to form the high temperature conduction member 40 which contacts the inner skin 17 in the direction of an axis in the interior of a heating roller 10, it becomes unnecessary to prepare plurality for a heating element 15, and the structure of heating element 14 portion and control are easy, and stop also being able to produce an equipment

failure easily. Moreover, since the necessity of enlarging the cross section of heating roller 10 the very thing (for example, a pipe 11 being made thick) is also lost, warm-up time is short and ends. Furthermore, since the high temperature conductivity member 40 is formed in the interior of the hollow pipe-like heating roller 10 unlike what was shown in drawing 7 and the inner skin 17 of a heating roller 10 is contacted, heat release other than heating roller 10 from the high temperature conductivity member 40 decreases. That is, the heat of the high temperature conductivity member 40 will get across to a heating roller 10 through the building envelope of a heating roller 10 in addition to the contact section with the inner skin 17 of a heating roller 10. Therefore, equalization of the temperature distribution in the direction of an axis of the heating roller 10 will be attained efficiently. That is, according to this anchorage device, it is simple for the structure of a heating element portion (therefore, also in case of control), and warm-up time is also short, it ends, and the effect that equalization of the temperature distribution in the direction of an axis of the heating roller 10 can be attained efficiently is acquired. And although there was a difficulty that the surface of a heating roller 1 tends to deteriorate, and equipment is enlarged, in the conventional technology shown in drawing 7 since the high temperature conductivity member 3 touched the surface of a heating roller 1 Since according to the anchorage device of the gestalt of this operation the high temperature conductivity member 40 is formed in the interior of the hollow pipe-like heating roller 10 and contacts the inner skin 17 of a heating roller 10, the surface of a heating roller 10 does not deteriorate but the effect of not enlarging equipment, either is acquired.

(b) Since the high temperature conduction member 40 consists of rollers, the touch area of the high temperature conductivity member 40 and the heating roller inner skin 17 becomes large, and becomes possible [attaining equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently]. And since the high temperature conduction member 40 consists of rollers, the effect that the rotation load of a heating roller 10 does not increase compared with the case where the high temperature conduction member 40 is constituted for example, from a slide contact member is also acquired. Furthermore, with the gestalt of this operation, since the surface (contact surface with the inner skin 17 of a heating roller 10) of the high temperature conduction roller 40 is covered with the elastic layer 41 of high temperature conductivity as shown in drawing 4 , while contact to the inner skin 17 of a heating roller 10 becomes certainly and smooth, a touch area also increases further and becomes possible [attaining equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently].

(c) Since the high temperature conduction member 40 contacts the inner skin 17 of a heating roller 10 about the hand of cut of a heating roller 10 [near the lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20], it becomes possible [attaining equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently] so that it may explain below. Namely, it is that Form P passes the pressure-welding section N of a heating roller 10 and the pressurization roller 20 in this kind of anchorage device. Since heat is taken by the form (and toner) in the contact section with the form P in both the rollers 10 and 20 and heat is not taken by Form P in the non-contact section, Supposing it does not adopt any means, either, the temperature distribution in the direction of an axis of a heating roller 10 will tend to become an ununiformity remarkably about the hand of cut of a heating roller 10 [near the lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20]. According to the anchorage device of the gestalt of this operation, on the other hand, the high temperature conduction member 40 The near lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20 about the hand of cut of a heating roller 10 Namely, since the inner skin 17 of a heating roller 10 is contacted in the location where the temperature distribution in the direction of an axis of a heating roller 10 tend to become an ununiformity remarkably, and a temperature gradient tends to become large The heat of elevated-temperature section (part corresponding to the non-contact section with form) 10a in a heating roller 10 will get across to low-temperature section (part corresponding to the contact section with form) 10b efficiently through the high

temperature conduction member 40. Therefore, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently.

(d) Since the heater 15 is arranged in the location where it is deflected from the center of rotation O of a heating roller 10, and the downstream of the part 18 corresponding to the pressure welding location N with the pressurization roller 20, i.e., the temperature of a contact part with the form [in / as mentioned above / the direction of an axis of the heating roller 10] P, becomes low about the hand of cut of a heating roller 10, the heat supply from the heater 15 to the low-temperature section will be made efficiently. Therefore, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently. And as mentioned above, since the high temperature conduction member 40 contacts the inner skin 17 of a heating roller 10 about the hand of cut of a heating roller 10 [near the lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20], it becomes possible [attaining equalization of the temperature distribution in the direction of an axis of the heating roller 10 much more efficiently].

[0018] <Gestalt of the 2nd operation> drawing 5 is the outline cross section (drawing equivalent to the III-III end face in drawing 2) showing the important section of the gestalt of operation of the 2nd of the anchorage device concerning this invention. In drawing 5, the same sign is given to the same portion as a gestalt thru/or the corresponding portion of implementation of the above 1st. The point that the gestalt of this operation differs from the gestalt of implementation of the above 1st has the high temperature conduction member 40 in the point that it is [/ near the upstream of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20] in contact with the inner skin 17 of a heating roller 10, about the hand of cut of a heating roller 10, and there is no change in other points. The same effect as the above (a) by the gestalt of the 1st operation, (b), and (d) is acquired also according to the gestalt of this operation. Moreover, since the high temperature conduction member 40 touches the inner skin 17 of a heating roller 10 about the hand of cut of a heating roller 10 [near the upstream of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20], just before a heating roller 10 contacts Form P, equalization of the temperature distribution in the direction of an axis will be attained, and the stable fixing condition will be acquired as a result.

[0019] <Gestalt of the 3rd operation> drawing 6 is the outline cross section (drawing equivalent to the III-III end face in drawing 2) showing the important section of the gestalt of operation of the 3rd of the anchorage device concerning this invention. In drawing 6, the same sign is given to the same portion as a gestalt thru/or the corresponding portion of implementation of the above 1st. The point that the gestalt of this operation differs from the gestalt of implementation of the above 1st Two high temperature conduction members (40 40') are prepared. The one high temperature conduction member 40 The inner skin 17 of a heating roller 10 is contacted about the hand of cut of a heating roller 10 [near the lower stream of a river of the part 18 corresponding to the pressure-welding location N with the pressurization roller 20]. Other one high temperature conduction member 40' is in the point of contacting the inner skin 17 of a heating roller 10 [near the upstream of said part 18], and there is no change in other points. According to the gestalt of this operation, the operation effect by the gestalt of the above 1st and the 2nd implementation will be acquired by coincidence.

[0020] As mentioned above, although the gestalt of operation of this invention was explained, this invention is not limited to the gestalt of the above-mentioned operation, and deformation implementation is possible for it suitably within the limits of the summary of this invention. For example, invention of those other than ** claim 2 may constitute the high temperature conduction roller 40 from the member which ****s to the inner skin 17 of a heating roller 10 instead of a roller.

** Only when you make it fixed to the small size paper (small form of the above-mentioned **** field P (width of face)) in which an attachment-and-detachment device is established to the high temperature conduction member 40, and especially temperature distribution tend to become an

ununiformity The high temperature conduction member 40 is made to contact the inner skin 17 of a heating roller 10. In being other (large size paper with high operating frequency (for example, A4 size paper)) By not making it contact, the warm-up time of a making [you / fixed to a form with high operating frequency] case can be shortened remarkably.

** Two or more high temperature conduction members 40 may be formed.

[0021]

[Effect of the Invention] By any anchorage device according to claim 1 to 6, it is simple for the structure of a heating element portion (therefore, also in case of control), and warm-up time is also short, it ends, and the effect that equalization of the temperature distribution in the direction of an axis of a heating roller can be attained efficiently is acquired. And the surface of a heating roller does not deteriorate but the effect of not enlarging equipment, either is also acquired. Furthermore, while becoming possible to attain equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently according to the anchorage device according to claim 2, the effect that the rotation load of a heating roller does not increase is acquired. According to the anchorage device according to claim 3, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently. According to the anchorage device according to claim 4, the stable fixing condition will be acquired. According to the anchorage device according to claim 5, the fixing condition stabilized further will be acquired. According to the anchorage device according to claim 6, it becomes possible to attain equalization of the temperature distribution in the direction of an axis of a heating roller much more efficiently.

[0022]

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- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Outline front view showing the important section of the gestalt of operation of the 1st of the anchorage device concerning this invention.

[Drawing 2] A positive cross section same as the above.

[Drawing 3] Partial abbreviation III-III end view in drawing 2 .

[Drawing 4] The expanded sectional view of a heating roller.

[Drawing 5] The outline cross section showing the important section of the gestalt of operation of the 2nd of the anchorage device concerning this invention (drawing equivalent to the III-III end face in drawing 2).

[Drawing 6] The outline cross section showing the important section of the gestalt of operation of the 3rd of the anchorage device concerning this invention (drawing equivalent to the III-III end face in drawing 2).

[Drawing 7] Explanatory drawing of the conventional technology.

[Description of Notations]

10 Heating Roller

15 Heater

17 Inner Skin

20 Pressurization Roller

40 High Temperature Conduction Roller (High Temperature Conduction Member)

N Pressure-welding location

[Translation done.]

* NOTICES *

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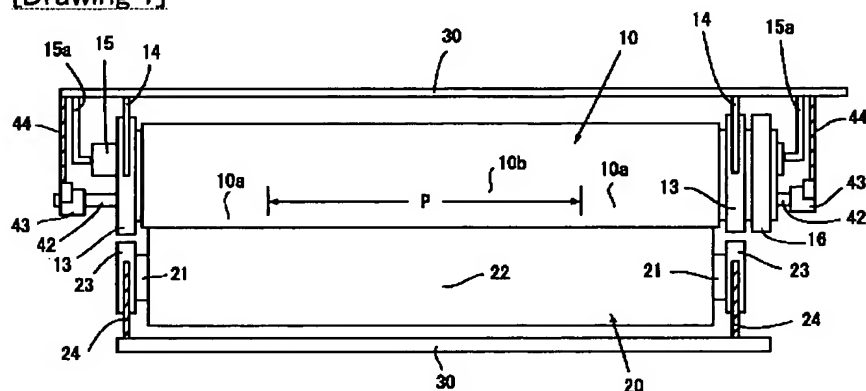
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

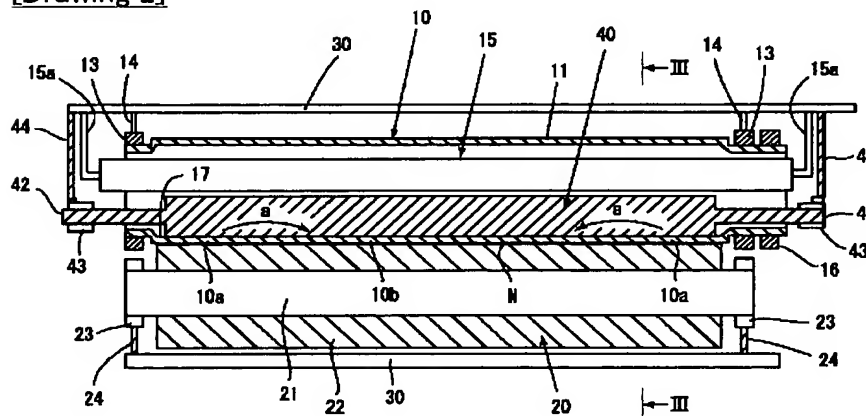
DRAWINGS

[Drawing 1]



82857-01

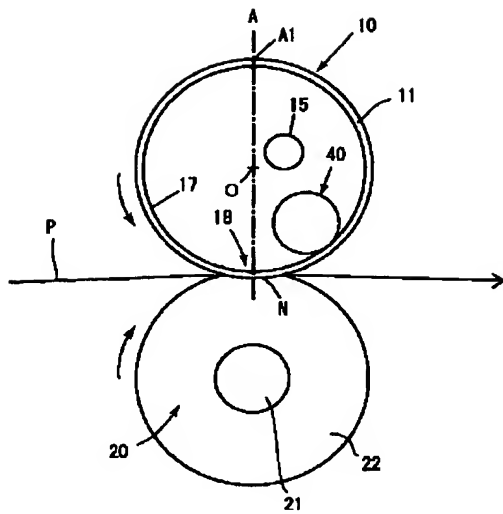
[Drawing 2]



82857-02

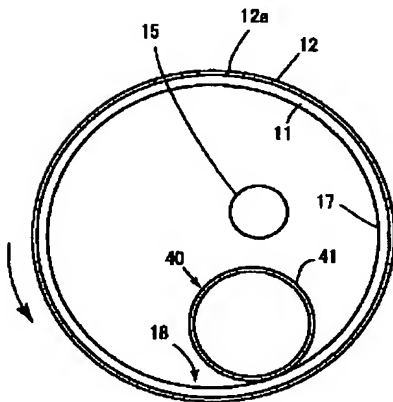
[Drawing 3]

82857-03



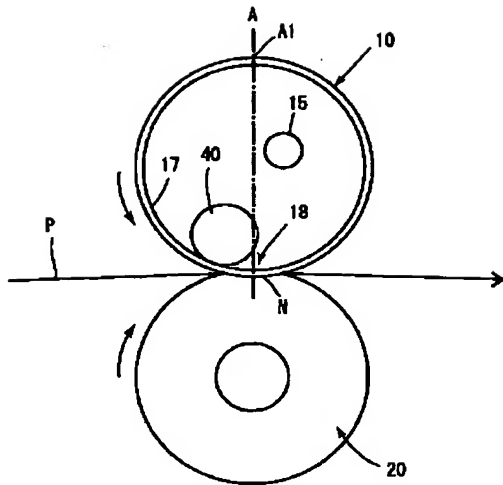
[Drawing 4]

82857-04



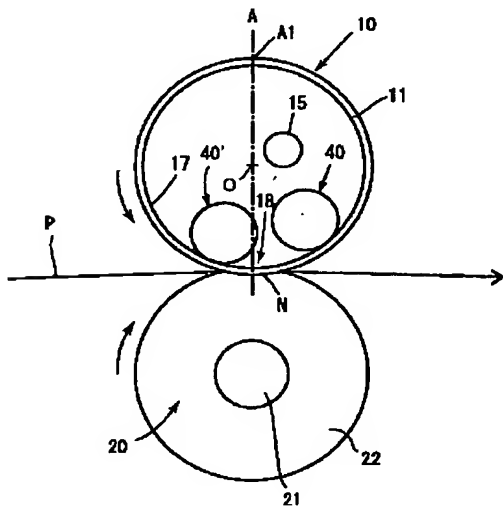
[Drawing 5]

82857-05



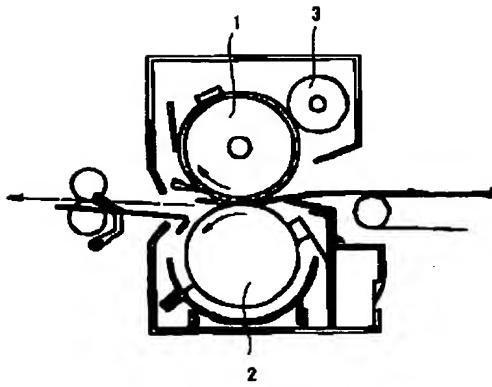
[Drawing 6]

82857-06



[Drawing 7]

82857-07



[Translation done.]

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F16C 13/00		F16C 13/00	C 3J103
			E 3K058
H05B 3/00	335	H05B 3/00	335

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(21) 出願番号	特開2001-07577(P2001-07577)	(71) 出願人	000002369 セイコーエプソン株式会社
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		(74) 代理人	100093115 弁理士 佐藤 昇 Fターム(参考) 2H033 A003 A30 B803 B813 B818 B821 B828 B834 3J103 A461 B403 B417 F401 F420 G002 G457 G459 G460 3K058 A866 B418 D401

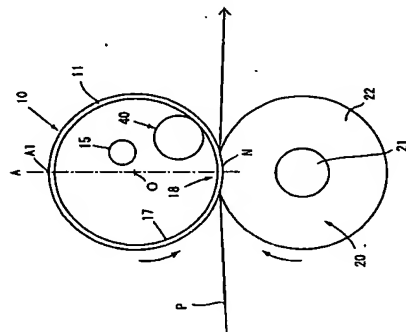
(54) [発明の名称] 定着装置

(57) [要約]

【課題】 発熱部分の構造 (制御) が複雑でウォームアップ時間も短くして済み、効率的に加熱ローラの軸線方向における温度分布の均一化を図る。

【解決手段】 内部にヒータ15が配置された中空パイプ状の加熱ローラ10の内部に、その軸線方向においてその内周面と接触する高熱伝導ローラ40を設けし、加熱ローラ20との圧接位置Nに対応する部位18の下流近傍または上流近傍に設け、ヒータ15は、加熱ローラの回転中心から偏倚させて下流側に配置する。

82857-03



【発明の要約】

【請求項1】 内部にヒータが配置された中空パイプ状の加熱ローラと、この加熱ローラに圧接されている加熱ローラとを備えた定着装置において、

前記加熱ローラの内部に、その軸線方向においてその内周面と接触する高熱伝導部材が設けられていることを特徴とする定着装置。

【請求項2】 前記高熱伝導部材がローラで構成されていることを特徴とする請求項1記載の定着装置。

【請求項3】 前記高熱伝導部材が、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触することを特徴とする請求項1または2記載の定着装置。

【請求項4】 前記高熱伝導部材が、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の上流近傍において加熱ローラの内周面と接触することを特徴とする請求項1または2記載の定着装置。

【請求項5】 前記高熱伝導部材が、少なくとも2つ設けられていて、その1つの高熱伝導部材が、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触し、他の1つの高熱伝導部材が、前記部位の上流近傍において加熱ローラの内周面と接触することを特徴とする請求項1または2記載の定着装置。

【請求項6】 前記ヒータが、加熱ローラの回転中心から偏倚しており、かつ、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流側に配置されていることを特徴とする請求項1～5のうちいずれか1項に記載の定着装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、電子写真技術を用いて用紙等の記録材にトナー画像を形成することのできるプリンター、ファクシミリ、複写機等の画像形成装置に用いられる定着装置に関するものである。

【0002】

【従来の技術】 一般に、電子写真技術を用いて用紙等の記録材 (以下単に用紙という) 上にトナー画像を形成する画像形成装置は、回転駆動される感光体と、この感光体に露光して表面に静電潜像を形成する露光手段と、前記静電潜像を現像してトナー画像となす現像手段と、そのトナー画像を用紙に転写させる転写手段と、この転写手段によりトナー画像が転写された用紙を通過させつつ加熱して用紙上にトナー画像を定着させる定着装置とを有している。

【0003】 従来の一般的な定着装置は、加熱される加熱ローラとこの加熱ローラに圧接されている加圧ローラとを備えており、これら両ローラによって、通過する用紙を挟圧しつつ加熱し、用紙上のトナー画像を用紙上に溶融定着させるようになっている。

【0004】 このような定着装置においては、両ローラ、特に加熱ローラの軸線方向における温度分布が均一であることが望まれるが、両ローラの圧接部を用紙が通過することで、両ローラにおける用紙との接触部においては用紙 (およびトナー) に熱が奪われ、非接触部においては用紙に熱が奪われないため、特に、連続して定着動作が行われると、上記接触部に比べて非接触部の温度が著しく上昇し、結果として、両ローラの軸線方向における温度分布を均一に維持することが困難になるという問題がある。

【0005】 そこで、このような問題を解決するため、従来、次のような技術がすでに提案されている。

(1) 加熱ローラの軸線方向に関して異なる温度分布をもつ発熱体を複数用意し、定着時の加熱ローラの温度分布に応じて、作動させる発熱体を変更する。

(2) 加熱ローラの断面径を大きくすることで軸線方向における熱伝導性および熱容量を高め、温度分布の均一化を図る。

(3) 図7に示すように、加熱ローラ1の表面に列し、高熱伝導性の部材3を接触させて、温度分布の均一化を図る (特開平8-87191号)。なお、図7においては、2は加圧ローラである。

【0006】

【発明が解決しようとする課題】 上述した従来の技術には、それぞれ次のような問題がある。

(1) 加熱ローラの軸線方向に関して異なる温度分布をもつ発熱体を複数用意し、定着時の加熱ローラの温度分布に応じて作動させる発熱体を変更する技術では、発熱体部分の構造や制御が複雑化し、機器の故障を招きやす

い。

(2) 加熱ローラの断面径を大きくすることで軸線方向における熱伝導性および熱容量を高め、温度分布の均一化を図る技術では、加熱ローラの熱容量が大きくなるため、ウォームアップ時間 (加熱ローラが所定温度に達するまでの立ち上がり時間) が長くなり、結果としてエネルギーの無駄が多くなる。

(3) 図7に示した、加熱ローラ1の表面に対し、高熱伝導性の部材3を接触させて、温度分布の均一化を図る技術では、加熱ローラ1の表面に対して高熱伝導性部材3が接触しているため、高熱伝導性部材3からの加熱ローラ1以外への放熱量が大きくなり、必ずしも効率的に加熱ローラの軸線方向における温度分布の均一化を図ることができない。

【0007】 この発明の目的は、以上のような問題を解決し、発熱体部分の構造が (したがって制御も) 簡単でウォームアップ時間も短くして済み、効率的に加熱ローラの軸線方向における温度分布の均一化を図ることができ、定着装置を提供することにある。

【0008】

【課題を解決するための手段】 上記目的を達成するため

る。すなわち、この請求項１記載の定着装置において、発熱体部分の構造が（したがって制御も）簡便でウォームアップ時間も短く済み、効率的に加熱ローラの軸方向における温度分布の均一化を図ることができるという効果が得られる。しかも、図７に示した技術においては、高熱伝導性部材３が加熱ローラ１の表面に接触しているため、加熱ローラ１の表面が劣化するややく、また、装置が劣化するという観点があったことが、この請求項１記載の高熱伝導装置によれば、高熱伝導性の部材が、中空パイプ状の加熱ローラの内部に設けられていて加熱ローラの内周面と接触するので、加熱ローラの表面が劣化せず、装置も大型化しないという効果が得られる。請求項２記載の定着装置によれば、請求項１記載の定着装置において、前記高熱伝導部材がローラで構成されているので、高熱伝導性部材と加熱ローラ内周面との接合面積が広くなり、一度効率的に加熱ローラの軸方向における温度分布の均一化を図ることが可能となる。しかも、高熱伝導部材がローラで構成されているので、高熱伝導部材を例えば筒接部材で構成した場合に比べて、加熱ローラの回転負荷が増大しないという効果も得られる。請求項３記載の定着装置によれば、請求項１または２記載の定着装置において、前記高熱伝導部材は、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触するので、以下に説明するように、一度効率的に加熱ローラの軸方向における温度分布の均一化を図ることが可能となる。すなわち、前述したように、この種の定着装置においては、加熱ローラと加圧ローラの圧

に請求項１記載の定着装置は、内部にヒータが配置された中空パイプ状の加熱ローラと、この加熱ローラに圧接させられている加圧ローラとを備えた定着装置において、前記加熱ローラの内部に、その軸方向においてその内周面と接触する高熱伝導部材が設けられていることを特徴とする。請求項２記載の定着装置は、請求項１記載の定着装置において、前記高熱伝導部材がローラで構成されていることを特徴とする。請求項３記載の定着装置は、請求項１または２記載の定着装置において、前記高熱伝導部材が、加熱ローラの内部に設けられていて加熱ローラの内周面と接触することを特徴とし、加圧ローラと加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触することを特徴とする。請求項４記載の定着装置は、請求項１または２記載の定着装置において、前記高熱伝導部材が、加熱ローラの回転方向に関して、加熱ローラとの圧接位置において加熱ローラの内周面と接触することを特徴とし、加圧ローラと加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の上流近傍において加熱ローラの内周面と接触することを特徴とする。請求項５記載の定着装置は、請求項１または２記載の定着装置において、前記高熱伝導部材が、少なくとも２つ設けられていて、その１つの高熱伝導部材が、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触し、他の１つの高熱伝導部材が、前記部位の上流近傍において加熱ローラの内周面と接触することを特徴とする。請求項６記載の定着装置は、請求項１～５のうちいずれか一項に記載の定着装置において、前記ヒータが、加熱ローラの回転方向から偏重しており、かつ、加熱ローラの回転方向に関し、加圧ローラとの圧接位置に対応する部位の下流側に設置されていることを特徴とする。

【0009】

【作用効果】 請求項1記載の定着装置によれば、内部にヒータが配置された中空パイプ状の加熱ローラと、この加熱ローラに圧接されている加圧ローラとを備えた定着装置において、前記加熱ローラの内部に、その軸線方向においてその内周面と接触する高熱伝導部材が設けられ、かつ、その軸線方向における温度分布が不均一になること（あるいは不均一とする）と、加熱ローラにおける高温部の熱が高熱伝導部材を介して低温度部へと伝わり、これにより、加熱ローラの軸線方向における温度分布を均一に維持することが可能となる。そして、加熱ローラの内部に、その軸線方向においてその内周面と接触する高熱伝導部材を設けるだけでよいので、複雑な発熱体を用意する必要がなくなると、発熱体部分の構造および制御が簡単で、機器の信頼性も生じ難くなる。また、加熱ローラ自体の断面積を大きくする必要もなくなるので、ウェーハアップ時間が短くて済む。さらに、図7に示したものと異なり、高熱伝導性部材は中空パイプ状の加熱ローラの内部に設けられていて加熱ローラの内周面と接触するので、高熱伝導性部材として加熱ローラ以外への放熱量が少なく、結果として効率の向上が図れる。

られることとなり、結果として、安定した定着状態が得られることとなる。請求項５記載の定着装置によれば、請求項１または２記載の定着装置において、前記高熱伝導部材が、少なくとも２箇所より少くとも５つ設けられていて、この１つの高熱伝導部材が、加熱ローラの回転方向に關し、加圧ローラとの圧接位置に対応する部位の下流近傍において加熱ローラの内周面と接触し、他の１つの高熱伝導部材が、前記部位の上流近傍において加熱ローラの内周面と接触すると、上述の如き加熱ローラの軸線方向における温度分布の均一化が図られるとともに、他の１つの高熱伝導部材によって、用紙との接触直前における温度分布の均一化を図られることとなり、結果として、より安定した定着状態が得られることとなる。請求項６記載の定着装置によれば、請求項１～５のうちいずれか１項に記載の定着装置において、前記ヒータが、加熱ローラの回転中心から偏倚しており、かつ、加熱ローラの回転方向に關し、加圧ローラとの圧接位置に対する部位に偏倚してゐるので、以下に説明するように、一層効果的に加熱ローラの軸線方向における温度分布の均一化を図ることが可能となる。

すなわち、前述したように、この種の定着装置において、加熱ローラと加圧ローラとの圧接部を用紙が通過することは、而ローラにおける用紙との接触部においては用紙（およびトナー）に熱が奪われ、非接触部においては用紙に熱が奪われなかったため、加熱ローラの軸線方向における温度分布は、加熱ローラの回転方向に關し、加圧ローラとの圧接位置に対応する部位の下流側において不均一になりやう。これに対し、この請求項６記載の定着装置によれば、ヒータが、加熱ローラの回転中心から偏倚しており、かつ、加熱ローラの回転方向に關し、加圧ローラとの圧接位置に対する部位の下流側に在り、加熱ローラの軸線方向における用紙との接触部における温度が低い位置に配置されているので、その低温部位に対するヒータからの熱供給が効果的にされることとなる。したがって、一層効果的に加熱ローラの軸線方向における温度分布の均一化を図ることが可能となる。したがって、また、この請求項６記載の構成は、上記請求項３の構成と組合せられた場合に特に有効なる。

【0010】
 【発明の実施の形態】以下、本発明の実施の形態について図面を参照して説明する。
 図1の実施の形態は本発明に係る定着装置の第1の実施の形態を示す概略正面図、図2は正面断面図、図3は図2における部分省略11-1-11端面図、図4は加熱ローラの拡大断面図である。
 【0011】これらの図に示すように、この定着装置は、加熱ローラ10とこの図に示すように、この定着装置に圧入されている加圧ローラ20とを備えている。

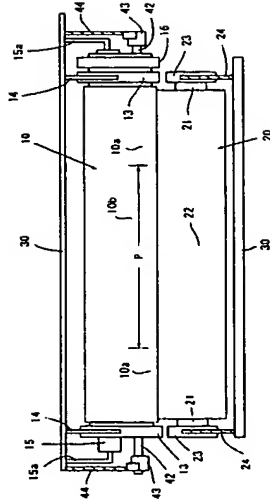
【0012】加熱ローラ10は、図4に示すように、金

図12は、その表面に被覆された弾性層12と、さらにその表面に被覆された表層（例えはPFA層）12aとを備えており、図1、図2に示すように、パイプ11の両端が軸受け13および支持部材14によって、定着装置のフレーム30に回転可能に支持されている。パイプ11の内部には、柔軟手段であるヒータ15が挿通されており、このヒータ15によって加熱ローラ10が加熱される。加熱ローラ10は、その一端にギヤ16が固定されており、このギヤ16が図示しないモータを有する駆動機構のギヤに噛み合っていることによって回転駆動される。このギヤ16の内部には、その軸線方向（図2において左右方向）においてその内周面17と接触する高熱伝導部材40が設けられている。高熱伝導部材40は、アルミニウムや銅等の熱伝導率の高い材料で構成できることができ、この実施の形態では例えば、アルミニウムからなることができ、その形状は図4に示すように、加熱ローラ10の内周面17との接触を確保かつ円滑にし、さらに接点面積を広げるために、高熱伝導ローラ40の表面（高熱伝導層41）で被覆されている。図2に示すように、高熱伝導ローラ40は、その両端の軸42が軸受け43によって回転可能に支持されており、この軸受け43が、パイプ11により加熱ローラ10の内周面17へ向け付け付勢されていることにより加熱ローラ10の内周面17に圧接され、加熱ローラ10に伝動して回転する。図3に示すように、高熱伝導ローラ40は、加熱ローラ10の回転方向（図3において反時計方向）に傾し、加熱ローラ20との圧接位置Nに対応する部位18の下流近傍において、加熱ローラ10の両端19と後続した

【0014】図3に示すように、ヒータ15は、加熱ローラ10の回転中心Oから偏倚しており、かつ、加熱ローラ10の回転方向18の圧接部20との圧接位置A1に對應する部位18の圧接部に配置されている。なお、図3に示すように、回転中心Oと圧接部（圧接位置）Nとを通る線分（圧接部との法線）Aで加熱ローラ10を2分したとき、加熱ローラ10の回転方向18に沿って圧接部Nからその反対位置にある分利位置A1に至る領域（図3において線分Aの右側）を下流側といい、分利位置A1から圧接部Nに至る領域（図3において線分Aの左側）を上流側といっている。図1、図2において、15aは、ヒータ15をフレーム30に支持する支持部材である。

【0015】加圧ローラ20は、軸21と、この軸21の回りに装着された弾性体22とを有しており、軸21の両端部が軸受23によって回転可能に支持されておられ、この軸受23が、加圧バネ24により加圧ローラ10へ向けて付勢されていることで加圧ローラ10に圧接され、加圧ローラ10に從動して回転する。

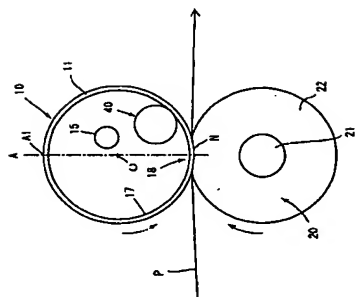
[図 1]



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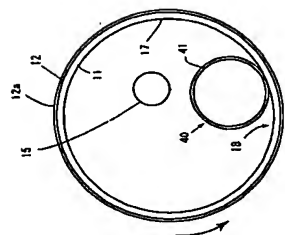
[図 3]

82857-03



[図 4]

82857-04

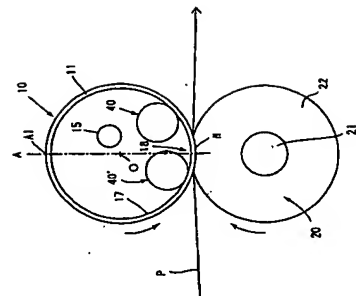
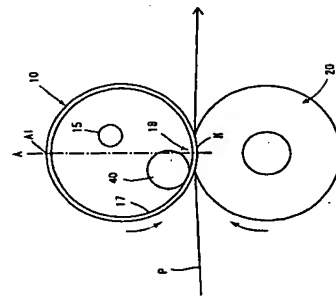


[図 6]

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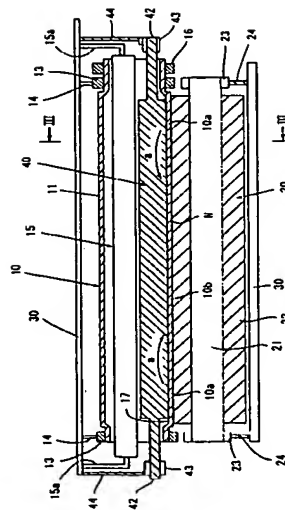
[図 5]

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[図 2]



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(9)

[図 7]

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